

Remarks

The above Amendments and these Remarks are in reply to the Office action mailed May 30, 2003. With the cancellation of Claims 5 and 7-10 and the addition of Claims 21-23, Claims 1-4, 6 and 15-23 are presented herewith for consideration.

Rejection of Claims 1, 5, 7 and 15-20 Under 35 U.S.C. §102(a)

Claims 1, 5, 7 and 15-20 are rejected under 35 U.S.C. §102(a) as being anticipated by U.S. Patent No. 5,709,802 to Furuhashi et al. ("*Furuhashi*"), U.S. Patent No. 6,495,893 to Lin et al. ("*Lin*"), or U.S. Patent No. 6,545,385 to Miller et al. ("*Miller*").

Claims 5 and 7 have been canceled from the application. Applicant has amended Claim 1 in such a way to overcome the rejection. And applicant respectfully traverses the rejection with respect to Claims 15-20.

Claim 1

Claim 1 has been amended to recite the feature of at least one foot on adjoining ends of the second and third plate. This feature is discussed in the application at page 12, line 16 through page 13, line 15:

As the actuation plate approaches the stationary plate, the force generated between the plates increases. If the plates get too close together, the actuation plate bends and collapses against the stationary plate. The present invention prevents this in a number of ways. First, as shown in Figs. 2-5 and in detail in Fig. 6, the ends of base plate 104, and the ends of the actuation plates 108a, 108b adjacent thereto, each include a pair of spaced apart feet 116 which extend off the end of the respective plates. As shown in Fig. 6, when for example the actuation plate 108a is pulled downward, the feet 116 prevent the plate 108a from contacting the electrode 102a, thus maintaining a spacing between the actuation plates 108a, 108b and the electrodes 102a, 102b. The feet 116 also prevent stiction between the actuation plates and a touch-down plate 118 by providing an essentially two point contact between the actuation plates and touch-down plates, as opposed to a line of contact which would otherwise occur without the feet 116. Moreover, as seen in Fig. 6, the microspring mechanisms between

adjacent plates (i.e., spring mechanisms 110a and 110b) bow downward when the associated actuation plate is pulled downward. The feet 116 further prevent the microspring mechanisms from contacting the touch-down plates upon pull down of the actuation plates and base plate. The touch-down plates 118 are in electrical connection with the actuation plates 108a, 108b via wires (not shown) so as to prevent an electrical short of the actuation plates upon touching down on touch-down plates 118.

The feature of the feet 116 as recited in Claim 1 is nowhere disclosed, taught or suggested in the cited references. It is therefore respectfully requested that the rejection of Claim 1 on section 102 grounds be withdrawn.

Claims 15-20

Claims 15 – 20 recite features which are nowhere disclosed, taught or suggested in the cited references. In particular, independent Claim 15 recites in part:

- a first plate, including ... a central portion between said first and second end;
- a second plate, including ... a first end pivotally mounted to said first plate at said central portion;
- a first voltage source for applying a first voltage to said first plate...; and
- a second voltage source for applying a second voltage to said second plate.

An embodiment such as recited in Claim 15 is disclosed for example in Figs. 13 and 14 and described in the application at page 19, line 14 through page 20, line 15:

Figs. 13 and 14 illustrate top and side views, respectively, of an embodiment of the present invention wherein the mirror 106 is flexibly cantilevered to a plate 108, which plate 108 is in turn flexibly cantilevered to an anchor 112. In particular, mirror 106 is cantilevered to plate 108 via one or more springs 110g. Plate 108 is flexibly cantilevered to anchor 112 via one or more springs 110h.

As seen in Fig. 14, upon application of voltage(s) V_1 and V_2 to electrodes 200 and 202, respectively, of a base layer, plate 108 is pulled into contact with a first electrode

204 and mirror 106 is pulled down into contact with a second electrode 206. V_1 may be equal to or different than V_2 in alternative embodiments, and V_1 may preferably be applied at the same time or after V_2 . While plate 108 and electrodes 204, 206 and 208 are shown grounded in Fig. 14, it is understood that the plate 108 and electrodes 200, 202, 208 may receive some other, common voltage in alternative embodiments. As plate 108 is large as explained above, a relatively low voltage V_2 may be used to pull the plate 108 toward electrode 200. As the plate moves toward the electrodes, the spacing between mirror 106 and electrode 202 decreases, thus allowing the mirror to be pulled into contact with the electrode 202 with a relatively low voltage V_2 .

A further advantage of the embodiment of Figs. 13 and 14 is the relatively large mirror angle which may be obtained using relatively small voltages. Moreover, the embodiment of Figs. 13 and 14 may be used as a multiposition switch with three stable positions: a first position where no voltages V_1 or V_2 are applied; a second position where voltage V_2 is applied; and a third position where voltages V_1 and V_2 are applied.

A further embodiment showing this claimed feature is also shown in Figs. 15 and 16, and described in the application at page 20, line 16 through page 21, line 16.

None of the cited references disclose, teach or suggest one plate pivotally mounted to a mid portion of a second pivotal plate, where each plate may be pivoted in response to independent actuation voltages. It is therefore respectfully requested that the rejection of Claim 15, as well as Claims 16-20 dependent thereon, on section 102 grounds be withdrawn.

Rejection of Claims 2-4 and 8-10 Under 35 U.S.C. §103(a)

Claims 2-4 and 8-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Furuhata, Lin*, or *Miller*.

Claims 8-10 have been canceled from the application, and applicant has amended Claims 2-4. In particular, as described above, Claims 2-4 each recite the feature of at least one foot for preventing the contact of the first and second plate ends with the first plate. This provides several advantages, including preventing

the actuation plates from bending or collapsing, stiction and the contact of the microspring with the first plate.

As none of Claims 1, or Claims 2-4 dependent thereon, teach the feature of at least one foot, nor the advantages provided thereby, it is respectfully submitted that Claims 1-4 are patentable over the cited references. It is therefore respectfully requested that the rejection of these claims be withdrawn.

New Claims 21-23

New Claims 21-23 have been added as dependent claims to allowed Claim 6. No new matter has been added.

Based on the above amendments and these remarks, reconsideration of Claims 1-4 and 15-20, and consideration of Claims 21-23, is respectfully requested.

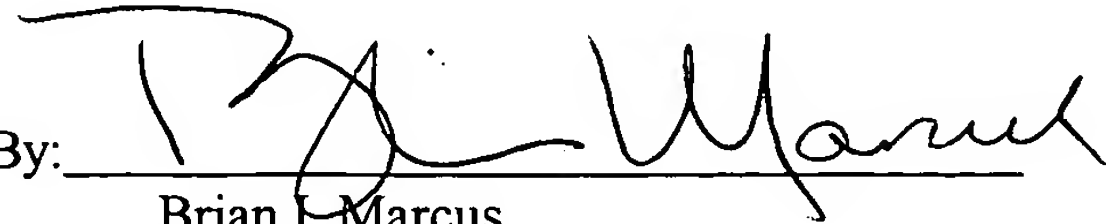
The Examiner's prompt attention to this matter is greatly appreciated. Should further questions remain, the Examiner is invited to contact the undersigned attorney by telephone.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 501826 for any matter in connection with this Response, including any fee for extension of time, which may be requested.

Respectfully submitted,

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